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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/764,935	01/26/2004	Michael R. St. John	7773	9633

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EXAMINER	
CORDRAY, DENNIS R	
ART UNIT	**PAPER NUMBER**
1791	
MAIL DATE	**DELIVERY MODE**
12/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/764,935	ST. JOHN ET AL.	
	Examiner	Art Unit	
	Dennis Cordray	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13,15-18 and 20-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13,15-18 and 20-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/22/2007 has been entered.

Response to Arguments

Applicant's arguments, see 7-8, filed 10/22/2007, with respect to the rejection of Claims 1-4, 6, 9, 13, 15-18 and 20-23 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Bjorkquist et al have been fully considered and are persuasive. Bjorkquist et al does not disclose a molecular weight above about 200,000. The rejection has been withdrawn.

Applicant's arguments with respect to the rejection of Claims 1-13, 15-18 and 20-23 under 35 U.S.C. 103(a) as being unpatentable over Coscia et al with or without others have been fully considered but they are not persuasive.

Applicant argues on pp 6-7 and 8-10 that Coscia et al does not teach or suggest ratios greater than 0.20:1 of aldehyde-functionalized to non-functionalized amide units. Applicant further argues that Coscia et al teaches away from glyoxal-functionalized polymers having a molecular weight above 25,000.

A reference is not limited to its preferred embodiment, but must be evaluated for all of its teachings, including its teachings of non-preferred embodiments. In re Burckel, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979).

Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. In re Susi, 440 F.2d 442, 169 USPQ 423 (CCPA 1971).

Coscia emphasizes several times that the ratio of aldehyde-functionalized to non-functionalized amide units should be at least 0.06 to produce practically useful wet strength (col 6, lines 59-66; col 13, lines 1-7; Claim 1). Ratios greater than 0.06 (which includes ratios greater than 0.2) are permitted although the gain in wet strength is minor. Coscia also teaches that a ratio in the range of 0.10 to 0.20 appears to afford the best wet strength efficiency (the Examiner construes this as the preferred range). Despite the emphasis on a lower limit of at least 0.06, no such repeated emphasis is placed on the only disclosed upper limit of 0.20. Coscia does not discourage the use of larger amounts of glyoxal-reacted amide groups, but only states that the increase in wet strength is minor. Thus, at the very least, a ratio of 0.2:1 is specifically disclosed, which touches the claimed range, and larger ratios are permitted but not preferred.

Regarding the molecular weight, the Examiner agrees that Coscia discloses that the polymers are water soluble at molecular weights from 100,000 to 1,000,000. Coasia et al also states that the polymers of the present invention are prepared from vinylamides having molecular weights up to the point where they do not dissolve in water (col 3, lines 61-64), thus starting polymers from 100,000 to 1,000,000 in molecular

weight are disclosed. The Examiner also agrees that Coscia et al states that [starting] polymers having molecular weights less than 25,000 are preferred (emphasis added) (col 3, lines 68-75). However, Coscia et al does not teach against or discourage using starting polymers of higher molecular weight (from 100,000 to 1,000,000). When the polymers of molecular weight greater than 300,000 are reacted with glyoxal, the molecular weight only increases, thus remaining within the claimed range.

Alternatively, The Examples given in the instant Specification use a starting acrylamide/DADMAC polymer with a molecular weight of 20,000 (p 14, lines 1-24) as allegedly representing the invention. If the glyoxal-reacted polymer is to have a final molecular weight within the claimed range, then many of the glyoxal monomers must be di-reacted to form crosslinks between adjacent acrylamide/DADMAC polymer chains and increase the overall molecular weight of the product, a reaction scheme that is known in the art. If a starting polymer having a molecular weight of 20,000 is reacted with gloxal to form a product with the claimed molecular weight, then even the preferred starting polymers of Coscia et al will form reacted products in the claimed molecular weight range.

The remaining rejections are modified to better present the Examiner's position and, in addition, new grounds of rejection are made as detailed herein.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 20 -22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 20 recites "a copolymer comprising ... diallyldimethylammonium chloride functionalized with glyoxal." It is not clear if the polymer is functionalized with glyoxal or if the diallyldimethylammonium chloride (DADMAC) is functionalized with glyoxal.

Claims 21-22 depend from and thus inherit the indefiniteness of Claim 20.

Claim Rejections - 35 USC § 102 and 35 USC § 103

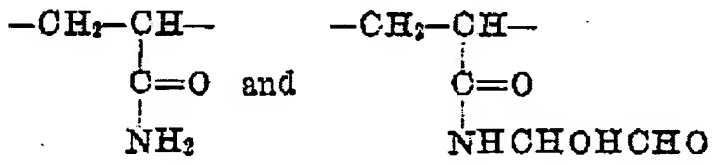
The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-10, 13, 15-18 and 20-22 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as being unpatentable over Coscia et al (3556932) as evidenced by Auhorn et al or Sanchez.

Coscia et al discloses adding an aldehyde-functionalized vinylamide polymers either to preformed paper or to the fibrous suspension in a papermaking process (Abstract; col 7, lines 23-31). The polymers contain at least 50 mole percent, preferably greater than 75 mole percent, and up to 99 mole percent vinylamide (nonionic) units, which are exemplified by acrylamide (col 3, lines 42-60; col 8, Example 1, lines 9-10 and 73-75). The remainder of the monomer units in the polymer can be ionic monomers or nonionic "spacers" (such as vinyl acetate) (col 3, lines 46-49 and 58-60). Ionic monomers include cationic, such as diallyldimethyl ammonium chloride (DADMAC, also exemplified in col 3, lines 42-60; col 8, Example 1, lines 9-10 and 73-75), and

anionic, such as acrylic acid (col 5, lines 69-72; col 10, Example 6, lines 45-46). The vinylamide units are partially glyoxylated such that a ratio of glyoxylated to non-glyoxylated units of at least 0.06:1 is obtained. The ratio may be higher and a preferred range of 0.1:1 to 0.2:1 (about 10-20% glyoxylated) gives the best results (col 6, lines 54-67). While the lower limit of 0.06:1 is repeatedly emphasized (col 6, lines 59-66; col 13, lines 1-7; Claim 1), no such emphasis is placed on the upper limit of 0.20:1. Coscia teaches that ratios higher than 0.06:1 can be used but the increase in wet strength is minimal (col 6, lines 53-58). The Examiner believes that Coscia discloses any ratio above 0.06:1 and that the disclosed upper limit of 0.20:1 is a preferred limit rather than an absolute limit. In any case, the disclosed ratio of 0.20:1 touches the claimed range.

The molecular weight of the starting non-reacted polymer can be from 100,000 to 1,000,000 (col 3, lines 64-66) and the glyoxylation reaction adds to the molecular weight. Thus, in some embodiments, the glyoxylated polymer has a molecular weight in the claimed range. The polymeric composition significantly overlaps the claimed compositions. Coscia et al teaches that, in their simplest form, the polymers of the invention comprise the units



which are acrylamide and monoreacted glyoxylated acrylamide, and units that supply ionic charge to the molecule (col 4, lines 48-56).

Coscia discloses that the glyoxylated acrylamide polymer is added to the papermaking fibrous suspension or to the preformed paper in an amount from 0.2 to 2% of the dry weight of the fibers, or from 4 to 40 lb/ton (col 7, lines 24-31 and 38-44) although smaller amounts also impart significant amount of wet strength.

Coscia et al does not disclose that the polymers enhance press section dewatering.

It is known in the art to use polymeric additives in papermaking for multiple simultaneous purposes, such as fixing agents, drainage and retention aids, flocculants and wet or dry strength aids (Auhorn et al, 6083348, col 2, lines 34-37), thus the claimed polymers can serve more than one purpose in the process. Sanchez teaches that polyacrylamides (100% nonionic), copolymers of polyacrylamide and α,β-unsaturated quaternary ammonium compounds (i.e.-DADMAC) and glyoxylated polyacrylamide-DADMAC copolymers increase dry strength of paper products (col 1, lines 49-51 and 61-63; col 8, lines 32-58). Sanchez also discloses acrylamide-DADMAC copolymers as dry strength agents and teaches that the copolymers provide several other advantages in papermaking processes, such as improved drainage and retention (dewatering aid), improved sheet formation and increased brightness (Abstract; col 2, line 63 to col 3, line 4 and lines 29-30).

The polymer disclosed by Coscia et al is substantially identical to the claimed polymer and Coscia et al adds the polymer to a paper sheet in the claimed amount. In addition to providing temporary wet strength, the copolymers disclosed by Coscia et al will also function to enhance press section dewatering because, where the claimed and

prior art apparatus or product are identical or substantially identical in structure or composition, a *prima facie* case of either anticipation or obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). In other words, when the structure recited in the reference is substantially identical to that of the claims, the claimed properties or functions are presumed to be inherent.

Claims 1-10, 13, 15-18 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Coscia et al in view of Bjorquist et as evidenced by Auhorn et al or Sanchez.

The disclosures of Coscia et al, Auhorn et al and Sanchez are used as above and supplemented by the following.

Coscia et al teaches that paper made using the disclosed copolymers has an advantageous property of losing part of its wet strength when soaked in water for a moderate amount of time, and loses substantially all of its wet strength when soaked in alkaline water. The paper is thus suitable for facial and other tissues for which permanent wet strength is undesirable (col 2, lines 33-43).

Bjorquist et al teaches that paper made using the products of Coscia et al could clog septic systems because they lose only about half of their wet strength on exposure to water (col 2, lines 17-25). Bjorquist et al further teaches that the rate of wet tensile decay is enhanced by increasing the relative proportion of hemiacetal bonds (reaction of cellulose hydroxyl groups with the aldehyde functionality) to amidol bonds formed (reaction of primary amide groups groups of one resin polymer with the aldehyde

functionality of a second resin polymer. The number of amidol bonds can be reduced by reducing the number of primary amide groups (col 4, lines 26-45). This reduction is accomplished in Bjorquist et al by increasing the fraction of glyoxylated acrylamide to acrylamide and replacing some of the acrylamide monomeric units with non-nucleophilic monomeric units.

Bjorquist et al discloses temporary wet strength resins with molecular weights from 5,000 to 200,000 having improved wet tensile decay over the wet strength resins of Coscia et al (Abs; col 2, lines 17-25). The resins have comprise copolymers of 3-65 mol-% acrylamide, 1-30 mol-% glyoxylated acrylamide, 1-10 mol-% cationic monomer and 5-95 mol-% of a polar non-nucleophilic monomer that does not cause the polymer to become water insoluble (col 3, lines 11-33). The polymers are aldehyde functionalized by reacting with glyoxal (col 6, lines 35-56). Preferred cationic monomers include diallyldimethylammonium chloride (col 5, lines 46-48). Using the disclosed mole percent ranges, the ratio of glyoxylated acrylamide to acrylamide ranges from 0.016:1 to 10:1. In the Examples provided, the ratio ranges from 0.03 to 2.4 (col 13, line 63 to col 15, line 11). The resins are added to paper in the amount from about 0.005% to about 2% by weight of the fiber, or from about 0.1 to about 40 lb/ton (col 9, line 66 to col 10, line 1).

The art of Coscia et al, Bjorquist et al, Auhorn et al, Sanchez and the instant invention is analogous as pertaining to paper containing glyoxylated acrylamide polymers. It would have been obvious at the time of the invention to one of ordinary skill in the art to obtain the claimed ratio of glyoxylated acrylamide to acrylamide in the

wet strength resins in the process of Coscia et al in view of Bjorquist et as evidenced by Auhorn et al or Sanchez to improve the wet tensile decay of the paper made using the resins.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Coscia et al, with or withour Bjorkquist et al as evidenced by Auhorn et al or Sanchez.

Coscia et al does not disclose spraying the polymer onto the sheet. Although not explicitly disclosed, spraying is a well known method of applying an aqueous solution to a paper and would have been obvious to one of ordinary skill in the art as a functionally equivalent option. Spraying before press dewatering would also have been obvious to minimize the necessity of an additional dewatering step and to aid in the distribution of the polymer into the paper.

Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Coscia et al, with or without Bjorkquist, in view of Carrier et al (5654198) as evidenced by Auhorn et al or Sanchez.

Coscia et al does not disclose a polymer containing zwitterionic monomers.

Carrier et al discloses that monomers used in preparing polymers useful in aqueous systems for problems associated with particulates, emulsification and flocculation (i.e.-dewatering) can be anionic, cationic and zwitterionic (col 3, lines 14-49). Carrier et al discloses copolymers comprising acrylamides and the anionic, cationic or zwitterionic monomers (col 3, lines 50-54; col 3, line 66 to col 4, line 11).

Pendant aldehyde functionality is added by covalently attaching an aldehyde containing monomer to the acrylamide (col 3, line 67 to 4, line 2; col 4, lines 42-46).

The Examples given in the instant Specification pertain to polymers comprising only acrylamide and DADMAC. No examples are presented of polymers comprising anionic or zwiterionic monomers.

The art of Coscia et al, Bjorkquist et al, Carrier et al and the instant invention are analogous as pertaining to the use of glyoxylated acrylamide polymers in papermaking. Absent evidence of unexpected results due to using zwitterionic monomers, it would have been obvious to one skilled in the art at the time of the invention to use a glyoxylated acrylamide polymer containing the claimed amount of zwitterionic monomers in the process of Coscia et al, with or without Bjorkquist, in view of Carrier et al as evidenced by Auhorn et al or Sanchez as a functionally equivalent option.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Schroeder et al (6472487) discloses other polymers comprising acrylamide, glyoxylated acrylamide, cationic, anionic and nonionic monomers used in papermaking for strength and retention aids.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Cordray whose telephone number is 571-272-8244. The examiner can normally be reached on M - F, 7:30 -4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DRC

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ERIC HUG
PRIMARY EXAMINER